



CanmetENERGY

Leadership in ecoInnovation

Hands-On Building Operation Optimization Training **Advanced Recommissioning (RCx) Course**

This course will cover the recommissioning process: planning, investigation, implementation and hand-off (see *RCx Standardized Process Flowchart*), and will emulate the actual phases of recommissioning to provide participants with a cohesive understanding of the process from start to finish. A discussion on commissioning, retrocommissioning, and recommissioning will highlight the differences between these processes (design-construction-testing vs. investigation-implementation), as well as the similarities between the two (system testing, trending, etc). The course will also cover persistence strategies for facility operating staff and 3rd-party recommissioning providers to maintain the benefits of the process over the life of a building.

Training topics include: the system approach, efficient methods for uncovering problems, working with the building staff, calculating savings, implementing findings, providing targeted documentation and training, and on-going commissioning best practices.

Day 1 – Planning

Day 1 of the course will focus on the tasks that typically occur during the planning phase of a recommissioning project. These include, but are not limited to:

- Building screening
- Benchmarking/utility bill analysis
- Project scoping
- Trending and data logging issues
- Engineering fundamentals

Students will participate in group activities based on real-world project data to reinforce the principles demonstrated during the class.

Day 2 and Day 3 – Investigation / Implementation

During the investigation phase, the commissioning provider performs a detailed analysis of operational improvements and energy conservation opportunities. Day 2 and Day 3 of the course will provide participants with a mixture of classroom lecture and group activities to demonstrate how to identify these opportunities. Using engineering fundamentals, methodologies, and tools, students will learn how to assess potential energy savings and report results in a consistent manner. An overview of recommissioning findings and in-depth evaluation of several of the most common



measures will expose participants to typical investigation results and examples of energy and cost savings potential.

Potential systems for evaluation include:

- Pumping
- Ventilation
- Economizers
- Reset strategies and interactions
- Terminal units
- Lighting controls
- Schedule issues
- Cooling tower reset
- Proper setpoints

Interactive group activities will reinforce the principles discussed during the class using data from actual recommissioning projects. Results from in-class exercises will be used to illustrate various implementation methodologies and techniques for selling recommissioning services.

Day 4 – Hand-off (half day)

Day 4 of the course will focus on the tasks and deliverables that are typically part of the hand-off phase of the recommissioning process. The discussion will reemphasize how “persistence” and “recommissioning” fit into the big picture of ongoing building performance. Students will learn how to develop a successful on-going commissioning plan to ensure the improvements implemented during the recommissioning process persist over time. The on-going tasks include, but are not limited to:

- Facility staff training
- Re-benchmarking and utility bill analysis
- Best practices for maintaining optimized system operation
- Trending and data analysis techniques used for troubleshooting and performance verification

The discussion will touch upon the International Performance Measurement and Verification Protocol (IPMVP) and how it may impact measurement and verification of the recommissioning project. In-class activities on Day 4 will include the development of a sequence of operations and an operational persistence matrix to demonstrate how persistence strategies are an essential element in the recommissioning process

Natural Resources Canada’s CanmetENERGY

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Building Operation Optimization Advanced Recommissioning (RCx) Course

Time		Day 1	Day 2	Day 3	Day 4
Start	End				
8:00	8:30	Registration			
8:30	9:00	<p style="text-align: center;">Introduction to RCx Process, Needs and Benefits</p> <p style="text-align: center;">Phase 1: Planning Pre-screening and Scoping</p>	<p style="text-align: center;">Phase 2: Investigation (con't) In-depth building investigation: system diagrams, system head losses, pumping opportunities</p>	<p style="text-align: center;">Phase 2: Investigation (con't) List of findings (common RCx measures for schedule, setpoints and resets) (including activities)</p>	<p style="text-align: center;">Phase 4: Hand-Off & Persistence Next RCx and ongoing Cx plans, including persistence and tracking (including activities)</p> <p style="text-align: center;">Conclusion</p>
9:00	9:30				
9:30	10:00				
10:00	10:30				
10:30	11:00				
11:00	11:30				
11:30	12:00				
12:00	12:30	Lunch	Lunch	Lunch	
12:30	13:00	<p style="text-align: center;">Planning Phase Activity: Develop a RCx Plan</p> <p style="text-align: center;">Phase 2: Investigation Engineering Fundamentals</p>	<p style="text-align: center;">Investigation Phase Activities: Review system diagram and pump test analysis; Perform pumping system analysis; Evaluate savings potential</p>	<p style="text-align: center;">Phase 2: Investigation (con't) List of findings (common RCx measures for economizers and ventilation control) (including activities)</p> <p style="text-align: center;">Phase 3: Implementation</p>	
13:00	13:30				
13:30	14:00				
14:00	14:30				
14:30	15:00				
15:00	15:30				
15:30	16:00				
16:00	16:30		Group Dinner (optional)		
16:30	17:00				
17:00	17:30				
17:30	18:00				
18:00	18:30				

Recommissioning (RCx) Process

